



*Recommendations
and
Reports*

MORBIDITY AND MORTALITY WEEKLY REPORT

Immunization of Adolescents

**Recommendations of
the Advisory Committee on Immunization Practices,
the American Academy of Pediatrics,
the American Academy of Family Physicians, and
the American Medical Association**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service
Centers for Disease Control
and Prevention (CDC)
Atlanta, Georgia 30333



visit provides the opportunity for a) ensuring vaccination of those adolescents not previously vaccinated with hepatitis B vaccine, varicella virus vaccine (if indicated), or the second dose of the measles, mumps, and rubella (MMR) vaccine; b) administering a tetanus and diphtheria toxoid (Td) booster; c) administering other vaccines that may be recommended for certain adolescents; and d) providing other recommended preventive services.

Flexibility in scheduling vaccinations is an important factor for improving vaccination coverage among adolescents. Because multiple-dose vaccines or simultaneous administration of several vaccines may be indicated for adolescents (Table 1), providers may need to be flexible in determining which vaccines to administer during the initial visit and which to administer on return visits.

IMMUNIZATION AS A PREVENTIVE HEALTH SERVICE FOR ADOLESCENTS

Administration of vaccinations should be integrated with other preventive services provided to adolescents. The importance of improving the vaccination levels and of providing other preventive services indicated for adolescents and young adults has been emphasized recently by many national organizations (Exhibit 1). In particular, AAP has advocated and provided specific recommendations for the vaccination of adolescents (2,3). Similarly, AMA and the Health Resources and Services Administration (HRSA) have proposed comprehensive recommendations that provide a framework for organizing the content and delivery of preventive health services (including vaccinations) for adolescents (4,5). The United States Preventive Services Task Force (USPSTF) has advocated specific vaccinations for adolescents that are based on the patient's age and risk factors (6). In addition, the American Academy of Family Physicians (AAFP) has recommended delivery of preventive services based on reviews by USPSTF and the AAFP Commission on Clinical Policies and Research (7). Guidelines recommended by these organizations include the delivery of preventive health services during a series of regular visits by adolescents to providers. These services include specific guidance on health behaviors; screening for biomedical, behavioral, and emotional conditions; and delivery of other health services, including vaccinations. The recommendations for vaccination of adolescents adopted by the Advisory Committee on Immunization Practices (ACIP), AAP, AAFP, and AMA are consistent with those of other groups that promote preventive health services for adolescents.

RATIONALE FOR VACCINE ADMINISTRATION DURING AN ADOLESCENT'S VISIT TO PROVIDERS

Hepatitis B Vaccine

In the United States, most persons infected with hepatitis B virus (HBV) acquired their infection as young adults or adolescents. HBV is transmitted primarily through sexual contact, injecting-drug use, regular household contact with a chronically in-

TABLE 1. Recommended childhood immunization schedule*—United States, July–December 1996

Vaccine	Age										
	Birth	1 Mo.	2 Mos.	4 Mos.	6 Mos.	12 Mos.	15 Mos.	18 Mos.	4–6 Yrs.	11–12 Yrs.	14–16 Yrs.
Hepatitis B [†]	Hep B-1										
		Hep B-2			Hep B-3					Hep B [§]	
Diphtheria and tetanus toxoids and pertussis [¶]			DTP	DTP	DTP	DTP (DTaP ≥15 mos.)			DTP or DTaP	Td	
<i>Haemophilus influenzae</i> type b ^{**}			Hib	Hib	Hib	Hib					
Poliovirus ^{††}			OPV	OPV	OPV				OPV		
Measles, mumps, and rubella ^{§§}						MMR			MMR	or MMR	
Varicella virus ^{¶¶}						Var				Var	

 Range of Acceptable Ages for Vaccination

 "Catch-Up" Vaccination

* This schedule is updated and published periodically. Vaccines are listed under the routinely recommended ages.

[†] **Infants born to hepatitis B surface antigen (HBsAg)-negative mothers** should receive the first dose (Hep B-1) of 2.5 µg of Recombivax HB[®] (Merck & Co.) or 10 µg of Engerix-B[®] (SmithKline Beecham). The second dose (Hep B-2) should be administered 1 month after the first dose. **Infants born to HBsAg-positive mothers** should receive 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth, and either 5 µg of Recombivax HB[®] or 10 µg of Engerix-B[®] at a separate site. The second dose is recommended at age 1–2 months and the third dose at age 6 months. **Infants born to mothers whose HBsAg status is unknown** should receive either 5 µg of Recombivax HB[®] or 10 µg of Engerix-B[®] within 12 hours of birth. The second dose of vaccine is recommended at age 1 month and the third dose (Hep B-3) at age 6 months.

[§] Adolescents who have not received three doses of hepatitis B vaccine should initiate or complete the series at ages 11–12 years. The second dose should be administered at least 1 month after the first dose, and the third dose should be administered at least 4 months after the first dose and at least 2 months after the second dose.

[¶] The fourth dose of diphtheria and tetanus toxoids and pertussis vaccine (DTP) may be administered at age 12 months if at least 6 months have elapsed since the third dose of DTP. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP) is licensed for the fourth and/or fifth vaccine dose(s) for children ages ≥15 months and may be preferred for these doses in this age group. Tetanus and diphtheria toxoids, adsorbed, for adult use (Td) is recommended at ages 11–12 years if at least 5 years have elapsed since the last dose of DTP, DTaP, or diphtheria and tetanus toxoids, adsorbed, for pediatric use (DT).

^{**} Three *H. influenzae* type b (Hib) conjugate vaccines are licensed for infant use. If PedvaxHIB[®] (Merck & Co.) *Haemophilus b* conjugate vaccine (Meningococcal Protein Conjugate) (PRP-OMP) is administered at ages 2 and 4 months, a dose at 6 months is not required. After completing the primary series, any Hib conjugate vaccine may be used as a booster.

^{††} Oral poliovirus vaccine (OPV) is recommended for routine vaccination of infants. Inactivated poliovirus vaccine (IPV) is recommended for persons—or household contacts of persons—with a congenital or acquired immune-deficiency disease or an altered immune status resulting from disease or immunosuppressive therapy and is an acceptable alternative for other persons. The primary three-dose series for IPV should be given with a minimum interval of 4 weeks between the first and second doses and 6 months between the second and third doses.

^{§§} The second dose of measles, mumps, and rubella vaccine (MMR) is routinely recommended at ages 4–6 years or at ages 11–12 years but may be administered at any visit provided at least 1 month has elapsed since receipt of the first dose.

^{¶¶} Varicella virus vaccine (Var) can be administered to susceptible children and adolescents at any time after age 12 months. Unvaccinated adolescents who lack a reliable history of chickenpox should be vaccinated at ages 11–12 years.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Source: Advisory Committee on Immunization Practices, American Academy of Pediatrics, and American Academy of Family Physicians.

fect person, or occupational exposure. However, the source of infection is unknown for approximately one third of persons who have acute hepatitis B (8).

A comprehensive vaccination strategy to eliminate transmission of HBV through routine vaccination of infants, adolescents ages 11–12 years, and adolescents who are at increased risk for HBV infection has been adopted (3,7,9,10). Any reduction in HBV-related liver disease resulting from universal vaccination of infants cannot be expected until vaccinated children reach adolescence and adulthood.

Routine vaccination of adolescents 11–12 years of age who have not been vaccinated previously is an effective strategy for more rapidly lowering the incidence of HBV infection and assisting in the elimination of HBV transmission in the United States (3,10). An adolescent's visit at ages 11–12 years gives the provider an opportunity to initiate protection against HBV before the adolescent begins high-risk behaviors. Unvaccinated adolescents >12 years of age who are at increased risk for HBV infection also should be vaccinated (10). Such adolescents are at increased risk for HBV infection and should be vaccinated against hepatitis B if they a) have multiple sexual partners (i.e., more than one partner in a 6-month period), b) use illegal injecting drugs, c) are males who have sex with males, d) have sexual or regular household contact with a person who is positive for hepatitis B surface antigen, e) are health-care or public-safety workers who are occupationally exposed to human blood, f) are undergoing hemodialysis, g) are residents of institutions for the developmentally disabled, h) are administered clotting factors, or i) travel to an area of high or intermediate HBV endemicity for ≥ 6 months. In addition, AAP recommends that providers administer hepatitis B vaccine to all adolescents for whom they provide services (3).

Adolescents can be vaccinated against hepatitis B in various settings, including schools and providers' offices. In the United States, school-based demonstration projects to vaccinate adolescents against hepatitis B have achieved >70% vaccination coverage (11–13).

Adolescents should receive three age-appropriate doses of hepatitis B vaccine (Table 2). Hepatitis B vaccine is highly immunogenic in adolescents and young adults when administered in varying three-dose schedules (14,15). A schedule of 0, 1–2, and 4–6 months is recommended. Flexibility in scheduling is an important factor for achieving high rates of vaccination in adolescents. When the vaccination schedule is interrupted, the vaccine series does not require reinitiation (CDC, unpublished data; 16). Studies of "off-schedule" vaccinations indicate that if the series is interrupted after the first dose, the second dose should be administered as soon as possible, and the second and third doses should be separated by an interval of at least 2 months. If only the third dose is delayed, it should be administered as soon as possible. Intervals of up to 1 year between administration of the first and third doses induce excellent antibody responses (15), and studies are in progress to evaluate longer intervals.

Measles, Mumps, and Rubella Vaccine

The sustained decline of measles in the United States has been associated with a shift in occurrence from children to infants and young adults. During 1990–1994, 47% of reported cases occurred in persons ages ≥ 10 years, compared with only 10% during 1960–1964 (CDC, unpublished data; 17). During the 1980s, outbreaks of measles occurred among school-age children in schools with measles-vaccination levels